

AD-A221 619

2

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</small>				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE April 6, 1990	3. REPORT TYPE AND DATES COVERED FINAL Report, 1 Apr 87 to 31 Dec 89		
4. TITLE AND SUBTITLE MULTIVARIATE MODEL BUILDING AND MODEL IDENTIFICATION		5. FUNDING NUMBERS AFOSR-87-0171 611027 2304/A5		
6. AUTHOR(S) Grace Wahba		7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Wisconsin Department of Statistics 1210 West Dayton Street Madison, WI 53706 AFOSR-TR.		
8. PERFORMING ORGANIZATION REPORT NUMBER 90-0427				
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR/NI Building 410 Bolling AFB, DC 20332-6448		10. SPONSORING/MONITORING AGENCY REPORT NUMBER AFOSR-87-0171		
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited.		12b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words) A very substantial number of results were obtained during this contract in the area of multivariate model building and model identification. A list of publications in which the Air Force Contract is mentioned appears below. We are continuing this work in the follow on contract, AFOSR/90-0103. The research monograph "Spline Models for Observational Data" by the PI was published by The Society for Industrial and Applied Mathematics in March 1990 as volume 59 in the prestigious CBMS-NSF Regional Conference Series in Applied Mathematics. Although the actual writing of this monograph was not supported by the AFOSR, a number of research results obtained under AFOSR sponsorship are discussed in it. We have acknowledged in the Foreword the research support of the AFOSR. (KR)				
14. SUBJECT TERMS		15. NUMBER OF PAGES		
		16. PRICE CODE		
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT SAR	

AFOSR-TR- 90 - 0 4 2 7

**MULTIVARIATE MODEL BUILDING
AND MODEL IDENTIFICATION
AFOSR-87-0171**

Grace Wahba, PI

Final Report

Date Submitted : April 8, 1990

The University of Wisconsin-Madison
Department of Statistics
1210 W. Dayton St.
Madison, WI 53706
(608)262-3620, 262-2598



Accession For	
1.000000	<input checked="" type="checkbox"/>
2.000000	<input type="checkbox"/>
3.000000	<input type="checkbox"/>
4.000000	
5.000000	
6.000000	
7.000000	
8.000000	
9.000000	
10.000000	

A-1

A very substantial number of results were obtained during this contract in the area of multivariate model building and model identification. A list of publications in which the Air Force Contract is mentioned appears below. We are continuing this work in the follow on contract, AFOSR 90-0103.

The research monograph "Spline Models for Observational Data" by the PI was published by The Society for Industrial and Applied Mathematics in March 1990 as volume 59 in the prestigious CBMS-NSF Regional Conference Series in Applied Mathematics. Although the actual writing of this monograph was not supported by the AFOSR, a number of research results obtained under AFOSR sponsorship are discussed in it. We have acknowledged in the Foreword the research support of the AFOSR.

References

- [1] Z. Chen, C. Gu, and G. Wahba. Comments to "Linear Smoothers and Additive Models, by Buja, Hastie and Tibshirani. *Ann. Statist.*, 17:515-521, 1989.
- [2] C. Gu. Generalized spline models: a Bayesian analysis. Technical Report 76, Statistics Dept, The University of British Columbia, Vancouver, Canada, 1989. submitted.
- [3] C. Gu. Generalized spline models: A convenient algorithm for optimal smoothing. Technical Report 853, Dept. of Statistics, University of Wisconsin, Madison, WI, 1989. submitted.
- [4] C. Gu. RKPAC and its applications: Fitting smoothing spline models. Technical Report 857, Dept. of Statistics, University of Wisconsin, Madison, WI, 1989. code available through netlib.
- [5] C. Gu, D.M. Bates, Z. Chen, and G. Wahba. The computation of GCV functions through householder tridiagonalization with application to the fitting of interaction spline models. *SIAM J. Matrix Anal.*, 10:457-480, 1989.
- [6] C. Gu, N. Heckman, and G. Wahba. A note on generalized cross validation with replicates. Technical Report 864, University of Wisconsin-Madison, Madison, WI, 1990, submitted.

- [7] C. Gu and G. Wahba. Minimizing GCV/GML scores with multiple smoothing parameters via the Newton method. *SIAM J. Sci. Statist. Comput.*, 1990, to appear.
- [8] G. Wahba. Partial and interaction spline models. In J. Bernardo, M. De-Groot, D. Lindley, and A. F. M. Smith, editors, *Bayesian Statistics 3*, pages 479–491. Oxford University Press, 1988.
- [9] G. Wahba. Regularization and cross validation methods for nonlinear, implicit, ill-posed inverse problems. In A. Vogel, editor, *Model Optimization in Exploration Geophysics*. Vieweg, Weisbaden-Braunschweig, 1989. to appear.
- [10] G. Wahba. *Spline Models for Observational Data*. SIAM, 1990. CBMS-NSF Regional Conference Series in Applied Mathematics, vol. 59, xii + 168 pp.